

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number  
**WO 01/19102 A1**

(51) International Patent Classification?: H04Q 7/22,  
H04L 29/06

(21) International Application Number: PCT/EP00/08521

(22) International Filing Date: 31 August 2000 (31.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
9920681.5 2 September 1999 (02.09.1999) GB  
9927354.2 19 November 1999 (19.11.1999) GB

(71) Applicant (for all designated States except US): NOKIA  
MOBILE PHONES LIMITED [FI/FI]; Keilalahdentie 4,  
FIN-02150 Espoo (FI).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ZILLIKENS,

Frank [DE/DE]; Siechenmarschstr. 11a, D-33615 Bielefeld (DE). HOYLER, Stefan [DE/DE]; Voedestr. 80, D-44866 Bochum (DE).

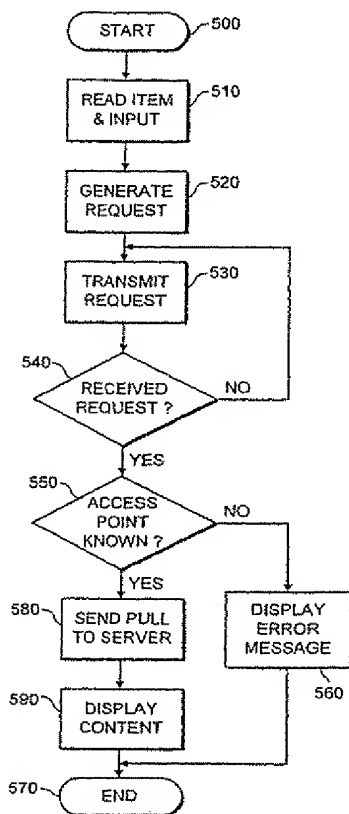
(74) Agents: JEFFERY, Kendra et al.; Nokia IPR Department, Nokia House, Summit Avenue, Farnborough, Hampshire GU14 0NG (GB).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

[Continued on next page]

(54) Title: A WIRELESS COMMUNICATION TERMINAL FOR ACCESSING LOCATION INFORMATION FROM A SERVER



(57) Abstract: A system (301), a method, and a wireless communication terminal (1, 300) for accessing location information from at least one server (320-340). The terminal (1, 300) comprising a receiver and a transmitter (19) arranged to receive and transmit data packets from/to at least one server (320-340) comprising location means, through a wireless communication network (310) connected to linking means (360). The linking means (360) is arranged to forward the data packets between the terminal (1, 300) and the server (320-340). A memory (17a, 17b) is also provided in the terminal (1, 300), which comprises at least one item, which is provided with an access point which indicates the site of the server (320-340) to be accessed, wherein the server (320-340) is accessed by sending a request through the wireless communication network (310) as a data packet comprising the access point to the linking means (360) to access and receive content from the server (320-340). A browser application (20) is arranged in the terminal (1, 300), to establish a session to the linking means (360).

WO 01/19102 A1

WO 01/19102 A1



IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *With international search report.*

A wireless communication terminal for accessing location information from a server.

The invention relates to a method, terminal and system for providing location  
5 information from a server to a wireless communication terminal.

There are many ways of determine positions, for example the position of a car can be determined by means of so called car navigation systems. These kind of navigation systems may comprise a satellite receiver connected to  
10 processing means and a mobile phone. The satellite receiver, e.g. a global position system (GPS) receiver, is able to receive signals giving an indication of the position of the receiver, i.e. in this case the car. The received signals can then be processed by the processing means, and sent by the mobile phone as a request to a server. The server can be provided with a location  
15 database comprising e.g. digitised maps, and is able to respond to the request. The respond can then be processed by the processing means, and can for example be shown as a digitised map on a display. In this way it will be possible to obtain location information, which is dependent on the position of the car.

20

One example on a navigation system is known from WO96/11381, which describes a navigation device for people. The device comprising a navigation unit which has a receiver device for the wireless transmission of data for detecting the current geographical position. It is possible to provide an input  
25 unit, in particular for the input of a target position. The result of this input is presented by an output unit, in particular for the output of path guiding data. To process the all data, the device further comprising a computer, in particular for route planning. The computer comprises a memory with a digitised road map and can be connected for data transmission to the navigation unit via a  
30 communication unit. The navigation unit, the communication unit, the input

unit and the output unit form a portable hardware unit. The communication unit comprising a transmitter-receiver for the wireless transmission of route data between the computer and the portable unit.

- 5 Another example of a navigation system is disclosed in WO 96/07110, which describes a navigation information system comprises a communications system having a fixed part and a mobile part. The fixed part including a data storage and processing means for identifying the location of a mobile unit, generating guidance information appropriate to that location and transmitting it
- 10 to the mobile unit. The user makes a request for guidance information, and the system, having determined the user's present location, then transmits instructions to the user. The user's present location can be determined by means such as a Satellite Positioning System.
- 15 An alternative way of measuring the position in a navigation system by satellite receivers, is shown in for example EP-A2-0753978, which describes a process for directing a subscriber toward a destination within an SDMA (Space Division Multiple Access) mobile radio network, and a processor controlled station control. The station control contains a communications
- 20 interface unit for receiving a message that specifies a destination desired by a subscriber, and a microprocessor which determines the current location of the subscriber by evaluating directional and distance information. The station control furthermore contains communications interface unit, whereby it retrieves information from a data base, which defines a route from the location
- 25 to the destination. This information is transmitted in summary form to the subscriber's mobile radio terminal.

However, all these navigation systems mentioned above, is all dependant of the location of the user. This means that the user who requests a service from

30 a service provider, e.g. a request of traffic information, should include its

present position. This is a major drawback, since this in some cases requires additional equipment, which can be rather expensive. Furthermore, the user has to convert the positioning information into a prescribed format, and send the positioning information to the server together with the service request.

- 5 This way is difficult to have cooperation with different service providers which can demand different types of formats.

Also, even the user uses a cellular position process as disclosed in EP-A2-0753978, this requires that the user disclose his actual position to the service  
10 provider. This means that the user must reveal his position, which is a major security hazard, if you are not sure about the trustworthiness of the service provider. For example, when the request is processed at the server, a hacker could more easily find out that where you are, or even worse include a virus in the response back to the terminal. Also, upon sending the actual position of  
15 the user, it will occupy a lot of space in the traffic on the wireless network, since data transmissions on a wireless network normally has a very narrow bandwidth.

Furthermore, in WO99/27742 a telecommunication system is disclosed, which  
20 uses a terminal based browser within a mobile phone to connect the phone to web-based location services and to a Mobile Positioning Centre (MPC). The browser is able to present graphical information, which permits the user of the mobile phone to determine the present location of the mobile phone. The browser is also able to communicate with a location services node, through a  
25 cellular network. To obtain the present location of the phone, the browser first sends a positioning request and format information associated with the positioning request to the location services node. Thereafter, the MPC receives the request from the location services node, and determine the phones coordinate location. The information about the location of the phone is  
30 then forwarded back to the phone and presented on the browser. However,

as disclosed in EP-A2-0753978, this requires that the user must disclose his actual position to the service provider, which means that the user must reveal his position, which is a major security hazard.

- 5 Therefore, there is a significant need for a wireless communication terminal to receive location information from a server more efficiently, which has a increased level of security. Also, it would be advantageous to avoid transmission of unnecessary position information. Yet another need is to have one single format for position information, which is independent of the format  
10 required by the service provider, in order to facilitate the use of different positioning tools.

In accordance with an aspect of the present invention there is provided a wireless communication terminal for accessing location information from a  
15 server. The terminal comprising a receiver and a transmitter arranged to receive and transmit data packets from/to at least one server comprising location means, through a wireless communication network connected to linking means. The linking means is arranged to forward the data packets between the terminal and the server. A memory is also provided in the  
20 terminal, which comprises at least one item, which is provided with an access point which indicates the site of the server to be accessed, wherein the server is accessed by sending a request through the wireless communication network as a data packet comprising the access point to the linking means to access and receive content from the server. A browser application is arranged  
25 in the terminal, to establish a session to the linking means by reading the item from the memory, enable the transmitter to send the request as a data packet through the linking means to the server, and handle received content by means of the receiver. A user interface connected to the browser application having display means for displaying content received from the  
30 server and user input means to provide an input to the browser application.

5

The input comprising a query of location information, which is independent of the position of the terminal, wherein the input is provided in the request, and arranged to receive content comprising an indication of the location information from said server by means of the location means.

5

Hence, the basic idea of the invention is to provide a request from a wireless communication terminal, like a cellular phone, for accessing location information from a server comprising location information, which is independent of the position of the terminal. This means that the terminal  
10 sends a request to the server for receiving an indication of location information, without revealing the position of the terminal upon sending the request to the server. As an example, the present invention can be implemented in a Wireless Application Protocol Architecture (WAP) environment. The Wireless Application Protocol (WAP) is a result of  
15 continuous work to define an industry wide standard for developing applications over cellular communication networks. This makes it possible to access for example the Internet or other kinds of information networks provided with hypermedia servers, from an ordinary cellular phone supporting WAP. These types of cellular phones which supports WAP, have only a small  
20 fraction of the resources of a typical desktop or portable computer. This means that the features in the phone are very limited compared to a computer. The reason for this limitation is the size of the phones, i.e. the phone has a severe limitation in processing power, memory space, display size and buttons or keys by which a user can request, view and manipulate  
25 information obtained from a hypermedia server. Therefore, it is very important that the features in the phone are made as efficient as possible. Also, the relatively high cost for a call from a cellular phone makes it also very important to provide the client with a fast response from the server.

6

A particular advantageous embodiment, is that the terminal can also be provided with position means, to determine position information of the terminal, and optionally send the positioning information to the server, either when requested from the server or in the request sent to the server, in order to give an indication of the position of the terminal. Thus, it is the user who controls the information sent between the terminal and the server, since it is optional. Also, this will provide a high degree of freedom for the user, to choose between different alternatives, by making a choice if any position information should be sent to the server.

10

Further advantages according to the present invention will be apparent from the dependent claims.

15 The invention will be described in greater detail in the following by way of example only and with reference to the attached drawings, in which

Fig.1 schematically illustrates a preferred embodiment of a hand portable phone according to the present invention.

20 Fig. 2 schematically shows the essential parts of a telephone for communicating with a cellular or cordless network.

Fig. 3 schematically shows a connection between a communication terminal and different servers in a network, according to a preferred embodiment according to the present invention, and

Fig. 4 shows a flowchart over a method for receiving location information from a server to a cellular telecommunication terminal, according to the present invention.

30



7

Fig. 5a-b shows an example of a user interface in a phone according to the present invention.

5 Fig. 6 shows a an example of the transmitted messages between a communication terminal, a network server and a gateway according to the invention

Fig. 1 shows a preferred embodiment of a wireless communication terminal, hereafter also referred to as a phone, according to the present invention. The phone, which is generally designated by 1, comprises a user interface having a keypad 2, a display 3, an on/off button 4, a speaker 5, and a microphone 6. The phone 1 according to the preferred embodiment is adapted for communication via a wireless telecommunication network, e.g. a wireless network. However, the phone could also have been designed for a cordless network. The keypad 2 has a first group 7 of keys as alphanumeric keys, by means of which the user can enter a telephone number, write a text message (SMS), write a name (associated with the phone number), etc. Each of the twelve alphanumeric keys 7 is provided with a figure "0-9" or a sign "#" or "\*", respectively. In alpha mode each key is associated with a number of letters and special signs used in text editing. The keypad 2 additionally comprises two soft keys 8, two call handling keys 9, and a navigation key 10.

The two soft keys 8 have a functionality corresponding to what is known from the phones Nokia 2110™, Nokia 8110™ and Nokia 3810™. The functionality of the soft key depends on the state of the phone and the navigation in the menu by using a navigation key. The present functionality of the soft keys 8 is shown in separate fields in the display 3 just above the keys 8.

The two call handling keys 9 are used for establishing a call or a conference call, terminating a call or rejecting an incoming call.

The navigation key 10 is an up/down key and is placed centrally on the front surface of the phone between the display 3 and the group of alphanumeric keys 7. Hereby the user will be able to control this key by simply pressing the up/down key using his/her thumb, i.e. it allows the user to scroll between a group of items in e.g. a menu provided in the user interface. Since many experienced phone users are used to one-hand control, it is a very good solution to place an input key, requiring precise motor movements. Thus, the user may place the phone in the hand between the finger tips and the palm of the hand. Hereby, the thumb is free for inputting information. In another embodiment, the scroll key can be a roller key (not shown), which is arranged to rotate in one or several directions. The roller allows the user to roll the key to scroll between different items in a menu. In case of a roller key, the soft key 8 could be arranged to the roller, i.e. upon pressing on the roller the same functionality, as the operation key has, could be entered. The roller key has a functionality corresponding to what is known from e.g. the phone Nokia 7110™, which also supports the Wireless Application Protocol (WAP). The roller key is incorporated by reference in US patent application 08/923,696.

Fig. 2 schematically shows the most essential parts of a preferred embodiment of the phone. These parts being essential to understand the invention. The preferred embodiment of the phone of the invention is adapted for use in connection with a GSM network, but, of course, the invention may also be applied in connection with other phone networks, such as other kinds of wireless networks and various forms of cordless phone systems or in dual band phones accessing sets of these systems/networks. The microphone 6 records the user's speech, and the analogue signals formed thereby are A/D converted in an A/D converter (not shown) before the speech is encoded in an audio part 14. The encoded speech signal is transferred to control means 18. The control means 18 comprises a processor, which may support

software in the phone. The control means 18 also forms the interface to the peripheral units of the apparatus, wherein the peripheral units can comprise a RAM memory 17a and a Flash ROM memory 17b, a SIM card 16, the display 3, a browser application 20, and the keypad 2 (as well as data, power supply, etc.). The browser application 20 can be used to request and receive content from a server, which is described in more detail hereinafter, with reference to Fig. 3-5. The control means 18 communicates with a transmitter/receiver means 19, e.g. a circuit which is adapted to send/receive a request/respond to/from a telecommunication network. The audio part 14 speech-decodes the signal, which is transferred from the control means 18 to the earpiece 5 via a D/A converter (not shown).

The control means 18 is connected to the user interface. Thus, it is the control means 18 which monitors the activity in the phone and controls the display 3 in response thereto. Therefore, it is the control means 18 which detects the occurrence of a state change event and changes the state of the phone and thus the display text. A state change event may be caused by the user when he activates the keypad including the navigation key 10, and these type of events are called entry events or user events. However, the network communicating with the phone may also cause a state change event. This type of event and other events beyond the user's control are called non user events. Non user events comprise status change during call set-up, change in battery voltage, change in antenna conditions, message on reception of SMS, etc.

25

#### Accessing location information from a server to a wireless communication terminal.

Figure 3 schematically shows a system 301, for accessing location information from a server. The system comprises a wireless communication

30

10

terminal 300, a wireless network 310, and a plurality of web servers 320, 330 and 340 in an Internet network 350. The Internet network 350 uses World Wide Web (WWW) protocols, and is provided with location means. The location means is arranged to receive/transmit data packets from/to the terminal. For example, the location means could be a database comprising digitised maps, and/or text information describing the location. The database can be updated continuously, in order to send updated location information to the terminal. The wireless network 310 is arranged to establish a wireless connection 305 between a plurality of wireless terminals 300 and linking means 360. Even if the linking means is usually connected to a server to be accessed, it is possible that the linking means may be integrated together with the server to be accessed, as well.

The terminals 300 are able to access at least one of the web servers 320-340 provided with location means, via the linking means 360. The terminals 300 could typically be a cellular phone. In general, the linking means 360 is arranged to enable a session for the wireless communication terminal 300 and to transmit data packets between the terminal and one of the web servers 320-340. Thus, the web servers 320-340 are arranged to receive and/or transmit data packets from/to the terminal 300. The transfer of data packets is often mentioned as pull and/or push. A pull could be described as the terminal using an access point to access a site where e.g. the location information is stored, and might also determine whether it has been updated and to retrieve it if necessary. In some cases it could also be possible to use a push, which could be described as the opposite to pull, i.e. the server maintains address data necessary to transfer updated location information to the terminal.

The linking means 360 in this example is typically a gateway or a proxy, but is hereafter referred to as gateway. A proxy server is a process that allows the user to fetch different types of documents, like WWW, FTP, and GOPHER

documents. The proxy server can store the documents in a cache memory in the radio terminal. What this means is that when anyone retrieves a document, besides transferring these files to the radio terminal, a copy can also be made on the local host. Thus, the next time the user accesses that document, a request is sent to the remote host to see if the page has been updated, and if not, it is read directly from the cache memory. A gateway can be a computer that lies at the intersection of a server to be accessed and a client, and routes traffic from one or several servers to the client. Thus, the function of the gateway is to provide a link between two disparate types of electronic communications such as WAP architecture and Internet architecture. Communication between a wireless terminal 300 and the gateway 360 is according to the Wireless Application Protocol (WAP).

WAP defines a set of standard protocols that enable communication between wireless communication terminals, like cellular phones and network servers. Other types of communication terminals could be pagers and personal digital assistants. WAP uses a standard naming model according to which standard Internet URLs are used to identify content on different web servers. It also uses content typing. All WAP content is given a specific type consistent with WWW typing which allows a wireless terminal to correctly process the content based on type. WAP also uses standard content formats and standard communication protocols. Thus, WAP brings Internet content and advanced data services to wireless terminals. WAP can work across differing wireless network technologies and bearer types (TDMA, CDMA, SMS). Communication between the web servers 320-340 and the gateway 360 is according to WWW protocols.

In this embodiment, the gateway 360 translates, i.e. formatting, requests for location information from a WAP protocol stack used by the wireless terminal 300 to a WWW (World Wide Web) protocol stack used by the web server. The

web server leaves a response with an indication of the location information, which can for example return WAP content such as WML (Wireless Markup Language), WMLScript, XML (Extensive Markup Language) and/or WWW content such as HTML (HyperText Markup Language). In the later case a filter  
5 is used to translate, i.e. format, the WWW content to WAP content e.g. HTML to WML, WMLScript or XML. In a preferred embodiment, the gateway is able to encode content sent over the wireless network to the wireless terminal and decode data sent to it by the wireless terminal. This means that the system, i.e. the terminal, the linking means and the server, can be provided with  
10 encoding/decoding means, which can enable a fast transmission of data packets between the server and the terminal. Hence, this enables a transfer of binary data packets, which is much easier (faster) to transfer than an uncoded data packet. One way of handling data packets in a binary format is to use so called WAP Binary Content Format, such as WBXML (Wireless Binary  
15 eXtended Markup Language).

In another preferred embodiment, the terminal can be provided with security means (not shown), which is able to demand a confirmation of the request sent to the server. The security means can be provided in the browser  
20 application, and can be either default or an optional feature, i.e. the user is able to or not able to interact. Hence, when the security means is activate, the user should confirm that he would like to send the request to the server. The major reason for having security means, is that the user in some cases reveals his position, which can be hazardous in some cases. For example, if  
25 you are not sure about the trustworthiness of the service provider. This means that when the request is processed at the server, a hacker could more easily find out that where the position of the user, or even worse include a virus in the response back to the terminal. Also, if the terminal is connected to position means, e.g. a navigation system for a vehicle, this could directly reveal the  
30 position of the user. Hence, the security means is able to provide the user

with some privacy, and not revealing any information to third parties without the user's permission.

- Also, the system can also encrypt/decrypt data packets between the terminal and the server, in order to provide a high level of security when transmitting wireless information. The data packets comprising the request, the formatted request, the response and the formatted request. This means that the gateway can be provided with encoders and decoders (not shown). Also, the server may comprise different algorithms to make the encryption/decryption.
- The encryption/decryption itself may be performed by well-known methods, e.g. RSA, Diffie-Hellman, etc. Regardless of the way how the position is gathered in the WAP Client, i.e. the terminal, the user of a location dependent service must be able to decide to whom she/he gives her/his position information. Additionally the user wants to make sure that her/his position is only available to a specified origin server and not to other parties. The decision of the user to whom she/he wants to give the position information can be realised in many different ways. For example,
1. The user is prompted in every time a WMLScript function, is processed.
  - 20 2. Managing a list of URLs, which point to trusted servers. The URL of the calling WMLScript could be checked against this list. This URL is known to the terminal by comparing the requested URL with a list of trusted servers. If the URL is reliable, the WMLScript function is executed. In the case of failure an invalid string can be returned.
  - 25 3. The client, i.e. the terminal, could request to encrypt, every time the output of the script library with the mechanism defined in a crypto library. The crypto library provides a possibility to sign data of a client, and is able to encrypt user data before sending it:

4. A Server certificate can be used, which only identifies the linking means. If the WMLScript was requested from a origin server, which is not the linking means, the linking means has to take care of the privacy.
- 5 Applying the second option to this preferred embodiment means, that the client should check the URL of the calling WMLScript, before the script function is executed. Only if the WMLScript was requested or pushed from a trusted server, which is listed in a special position trusted server list, the script is processed. This list can be managed by the user. Also, the crypto library
- 10 could be a so called WMLScript Crypto Library which will offer the possibility to sign data of a client with a digital signature before transmitting these to the origin server. Additionally this library provides the possibility to encrypt the user data, before sending it.
- 15 A Wireless Application Environment which forms an upper layer of the WAP stack includes a browser application, also called a microbrowser. Typically, the encoding/decoding means is provided in the browser application of the terminal. The browser can use WML and a lightweight markup language, WMLScript a lightweight scripting language. WML implements a card and
- 20 deck metaphor. The interaction of the browser and user is described in a set of cards which are grouped together into a document commonly referred to as a deck. The user navigates to a card in a deck reviews its content and then navigates to another card in the same deck or in a different deck. The user is also able to enter requested information, makes choices, and move on to
- 25 another card. Decks of cards are transferred from origin servers as needed. Cards are grouped together into decks. Thus, the content which the user receives mostly from a server comprises cards and decks. A WML deck is similar to a HyperText Markup Language (HTML) page, in that it is identified by an URL, and is the unit of content transmission. WML includes text and
- 30 image support, including a variety of formatting and lay-out commands. WML



includes support of explicitly managing the navigation between cards and decks. WML also supports anchored links, similar to those in HTML.

The wireless communication terminal differs from a desktop or a portable  
5 computer with Internet facilities in that generally it has a less powerful CPU, less memory, restricted power consumption, smaller displays and more limited input devices. The wireless network differs from the Internet network in that it generally has less bandwidth, more latency, less connection stability and less predictable availability. The WAP architecture is optimised for narrow  
10 bandwidth bearers with potentially high latency and is optimised for efficient use of device resources.

Upon communicating with the wireless network 310, in order to receive, access and transmit data packets from e.g. the web server 320 through the  
15 gateway 360, the wireless communication terminal 300 comprises a receiver and a transmitter, see also Fig.2 ref. no. 19. The terminal 300 further comprises a memory, see Fig.2 ref. no. 16 (SIM card) and 17b (ROM), provided with an identifier and at least one item. The item is provided with an access point which indicates the location of the server to be accessed, which  
20 could be indicated by means of a URL (Uniform Resource Locator) address. In addition, the item can also comprise data packets from earlier sessions which is updated upon a new session to the same access point. The identifier is used to identify content at the address provided by the server, wherein the server is accessed by sending the identifier to the linking means to identify  
25 which type of content is requested at the server. In addition, the content is associated with link content, which is provided at different locations in the server 320 or in another server 330, 340.

Also, the item can comprise a script, which is arranged to provide provisions  
30 for accessing servers through linking means. The script can activate or

- download linking applications from a gateway, i.e. an application which makes it possible to receive and/or transmit different types of data packets between the server and the terminal. For example, the different types of data packets can be a particular text format, software programs, picture formats. This can
- 5 be done by creating extensions to WML and WML script. Thus, the script can make it possible to access data packets, which might not be supported by the software in the terminal, by downloading the appropriate application, supporting the type of data format, directly to the terminal. In general, the data packets, can be data (content) stored or generated at an origin server 320.
- 10 The content of the data packet is typically displayed or interpreted by the client. This allows a standard WAP browser to be used and provides flexibility for new features, e.g. a service provider having location information supported by different formats dependent on the request. This can be done by creating extensions to WML-, WML script- and XML-documents. Thus, the script can
- 15 make it possible to access data packets, which might not be supported by the software in the terminal, by downloading the appropriate application, supporting the type of data format, directly to the terminal. In general, the data packets, is data (content) stored or generated at an origin server. The content of the data packet is to be displayed or interpreted by the client. For example,
- 20 one service provider supports a data packet comprising position information given by means of a satellite receiver, another server could support position information provided by cell identity information, and a third does not require any positioning information.
- 25 Instead of displaying the received content on a display provided on the phone, it is also possible to present the content by means of a speaker, which can be built in the phone or externally connected to the phone.

As mentioned before, the Wireless Application Environment forms an upper

30 layer of the WAP stack, and includes a browser application. To access

different servers the terminal is provided with a browser application, like the so called microbrowser. The browser application is arranged to establish a session to at least a gateway by reading the item in the memory. Also, the browser application can also be provided with pull means to fetch the content  
5 comprising location information from the server 320, at the site indicated by the access point.

In accordance with the present invention, the terminal 300 comprising a user interface (as shown in Fig. 1 reference no. 2, 3, 4, 5, and 6), which is  
10 connected to the browser application. The user interface having a display for displaying content received from a server and user input means to control the browser, by providing an input to the browser application. The input means could for example be a keypad or voice recognition means) to provide an input to the browser application. An example of how the user interface can be  
15 displayed during a session is shown in Fig. 5a-b. The input means is shown in Fig. 1 as the keypad 2. The browser can be arranged in a ROM memory or on a SIM card, as shown in Fig. 2 ref. No. 17b and 16, respectively. Hence, the input can be made if the user presses a key on the keypad of the terminal, and activate a request to a server 320-340. This request is arranged to be  
20 sent through the transmitter as a data packet. The input comprising a query identifying location information, and is associated with at least one access point, indicating the site of the server 320 to be accessed. The terminal is able to send this request without sending any information about its position to the server, i.e. the request is independent of the position of the terminal 300. This  
25 means that the terminal 300 is able to send a request to the server for receiving an indication of location information, without revealing the position of the terminal upon sending the request to the server. The input is provided in the request, together with the access point, and arranged to receive content comprising an indication of the requested location information from the server.  
30 To receive content with location information, the server 320-340 is provided

with location means, which may comprise digitised maps and/or text information over different locations. In this embodiment, the location means can be a deck, comprising cards with requested location information, of a language supporting WAP, like WML, WMLscript, or XML. It is also possible to  
5 have it in another format, and format the indication of the location information into a suitable format at the linking means.

In a preferred embodiment, the terminal could be connected to position means 370, provided with connecting means 380 to be inputted to the  
10 terminal. The position means could be a global positioning system (GPS) receiver, or by using cell identity information. The connecting means 380 can comprise a wired link or a wireless link (like an infra-red link or a low power RF link (e.g. Bluetooth)). If it comprises a wired link, it can also comprise a cable provided with electrical plugs, to physically connect the position means  
15 to the terminal. If the connecting means is a wireless link, it is suitable to provide the terminal with an appropriate protocol, to control the position means. Naturally, the wired link should also be provided an appropriate protocol, to control the position means. The position means 370 could provide greater flexibility to the user. For example, one who would like to use a GPS  
20 receiver will be independent of the wireless network, or may choose a less expensive solution to provide position information. Another example of position means is one who would like to use the wireless communication network, could obtain position information by receiving cell identity information, by using time difference information, and/or using time of arrival  
25 information. Thus, it is possible to provide an input unit, in particular for the input of a target position. The result of this input can also be presented by an output unit in the positioning means, in particular for the output of path guiding data. To process the all data, the position means further comprising a computer, in particular for route planning. The computer could comprise a  
30 memory with a digitised road map and can be connected for data

transmission to the server via a communication unit. Hence, it is possible to present the content received from the server on the positioning means, e.g. by a display and/or a speaker connected to the positioning means.

- 5 Accordingly, as a response to the request, the server can send a position request, as an indication of the requested location information. This position request can be a WML-Script, which is then processed by the browsing application. The position response from the terminal can then either be a rejection of the position request, or it can send a position response back to
- 10 the server indicating the position of the terminal. The position response can be provided by the positioning means, as mentioned above. After gathering the information to the position response, this information can be encoded to the binary representation of e.g. an XML-document. The output of this content encoding process, the binary representation of the XML-document, is then
- 15 returned in the position response of the WMLScript request. This string is designed for the transmission to the linking means, which can be decoded at the linking means, and can be sent to the server as an XML document. Finally, the position response to the server is then able to fetch the content of the requested location information. This can be made by sending the
- 20 requested location information through the linking means, back to the terminal. The presentation of the requested location information can be presented either directly to the user of the terminal, or it presented to the terminal itself. If the presentation is made on the terminal itself, it means that the terminal is able to update information itself. For example, if the user is
- 25 driving and should focus on the driving, it is not always very convenient to request for updated information manually. Therefore, this feature automatically provides the user with updated location information without requiring any user interaction.

In a preferred embodiment of the present invention, where it is required by the server to have the actual position of the terminal, this embodiment provides different ways of obtaining position information, if the terminal is not able to provide position information itself. If the terminal is not able to obtain position  
5 information, the terminal is able to send a content type or a header to the linking means, to provide the server with the requested position information. The header fields allow the terminal to pass additional information about the position request, and about the terminal itself, to the linking means. These fields act as request modifiers, with semantics equivalent to the parameters  
10 on a programming language method (procedure) invocation. In this embodiment, it is preferred to use the content type. This content type or header might contain an indication that the terminal is not able to provide this position information, and it could be possible for the user of the terminal to set an option to search for alternative ways of obtaining the position information of  
15 the terminal. This searching could e.g. be done by means of the linking means, or even by the server itself. If it is the linking means, which performs the search to find the location of the terminal, this information can be sent from the linking means to the server, e.g. as an XML-document, i.e. the linking means is able to generate an XML-document comprising the position  
20 information. The position information can be obtained from the cell identity information, which is provided by the wireless telecommunication network, by using time difference information, and/or using time of arrival information. If it is the server, which performs the search to find the location of the terminal, this information will then be handled by server and generates the requested  
25 location information, based on the obtained position information. The position information could also be obtained in the same manner as in the case of the linking means, i.e. by means of the cell identity information, which is provided by the wireless telecommunication network.

A method for providing location information from a server to a wireless communication terminal.

Fig. 4 shows a flow chart, in accordance with the present invention, describing a way of providing location information from a server through a wireless communication terminal. The wireless telecommunication terminal in this example is the same type as described in Fig.1 and 2, and the apparatus is hereafter also referred to as a phone. The phone is provided with a browser application and a memory which enables the user to browse among different objects on a server. This browsing can be done by using a browser application supporting WAP. When the phone is activated and establishes, a wireless connection to a wireless network, e.g. when the phone roams to a new network, "START" 500, it is possible to communicate with different telecommunication services, e.g. WAP related services, i.e. a service which can be accessed from a server to the phone. By using this kind of service, it might be possible to obtain information from a server to the phone, e.g. by using SMS (Short Message Service), or a similar service.

First, the user may select a browser menu on a display controlled by the browser application, which is connected to the memory. In this browser menu the user can choose to establish a session to a server comprising location means, e.g. in form of digitised maps and/or text giving indications of requested location information. In this embodiment, the location means can be a deck, comprising cards with requested location information, of a language supporting WAP, like WML, WMLscript, or XML. It is also possible to have it in another format, and format the indication of the location information into a suitable format at the linking means. To establish the session the user selects the service connected to the server from the menu. The selection is done by e.g. pressing on one of the softkeys as shown in Fig. 1.

In accordance with the present invention, the selection also comprise an input of location information inputted by means of e.g. the softkeys, which is independent of the position of the terminal. Then the browser application reads and identifies the content of an item from the memory, and the query identifying requested location information "READ ITEM" 510. This item comprises at least one access point, which indicates the location of the server to be accessed. The item might comprise more content than the access point, e.g. it is possible to have data packets received from an earlier session which is updated upon a new session to the same access point. The memory can also provided with an identifier, which is used to identify a content at the server. After reading the item from the memory, the browser application generates a request, "GENERATE REQUEST" 520, in order to receive an indication of the requested location information from the server, at the location indicated by the access point. This request comprising information of the access point to be accessed, the query of location information and the identifier identifying the content at the server. The information could for example be a URL address, where the server is located. The request is then sent through the transmitter as a data packet.

In a preferred embodiment, the terminal can be provided with security means (not shown), which is able to demand a confirmation of the request sent to the server. The security means can be provided in the browser application, and can be either default or an optional feature, i.e. the user is able to or not able to interact. Hence, the security means is able to provide the user with some privacy, and not revealing any information to third parties without the user's permission, i.e. when the security means is activate, the user should confirm that he would like to send the request to the server. This confirmation could for example occur if the server requires the actual position of the terminal. Then the response from the server could be a request for position information from the terminal, which the user can choose to accept and send the required



position information from the server. The major reason for having security means, is that the user in some cases reveals his position, which can be hazardous in some cases. For example, if you are not sure about the trustworthiness of the service provider. This means that when the request is processed at the server, a hacker could more easily find out that where the position of the user, or even worse include a virus in the response back to the terminal. Also, if the terminal is connected to the position means, as mentioned above, this could directly reveal the position of the user. To avoid this the WAP client, i.e. the terminal, should check the access point when calling a WMLScript, before the script function is executed. Only if the WMLScript was requested or pushed from a trusted server, which is listed in a special position trusted server list, the script is processed. This list can be managed by the user. Also, a crypto library could be a so called WMLScript Crypto Library which can offer the possibility to sign data of a client with a digital signature before transmitting these to the origin server. Additionally this library provides the possibility to encrypt the user data, before sending it.

In order to provide eventual position information to the server, the terminal could be connected to position means. The position means could be a global positioning system (GPS) receiver, or by using cell identity information. The position means could provide greater flexibility to the user. For example, one who would like to use a GPS receiver will be independent of the wireless network, or may choose a less expensive solutions to provide position information. Another example of position means is one who would like to use the wireless communication network, could obtain position information by receiving cell identity information, e.g. by using time difference information, and/or using time of arrival information.

The request is transmitted to linking means, "TRANSMIT REQUEST" 530, in order to establish a session between the linking means and the terminal. The

24

linking means is arranged to forward the data packets between the terminal and the server. The linking means could be a gateway or a proxy server, which links the requested information to the correct access point. If the linking means do not respond to the request, "RECEIVED REQUEST?" 540, e.g.

- 5 because the linking means is broken or the terminal does not have coverage to the wireless network, the terminal could receive an error message, which says that a connection to the linking means could not be established. Then, the user could choose to re-send the request once more, "TRANSMIT REQUEST" 530.

10

- The item can comprise a script, which is arranged to provide provisions for accessing servers through the linking means. The script can activate or download linking applications from a gateway, i.e. an application which makes it possible to receive and/or transmit different types of data packets between
- 15 the server and the terminal. For example, the different types of data packets can be a particular text format, software programs, different picture formats, etc. This allows a standard WAP browser to be used and provides flexibility for new features, e.g. a service provider having location information supported by different formats dependent on the request. This can be done by creating
- 20 extensions to WML-, WML script- and XML-documents. Thus, the script can make it possible to access data packets, which might not be supported by the software in the terminal, by downloading the appropriate application, supporting the type of data format, directly to the terminal. In general, the data packets, is data (content) stored or generated at an origin server. The content
- 25 of the data packet is to be displayed or interpreted by the client. For example, one service provider supports a data packet comprising position information given by means of a satellite receiver, another server could support position information provided by cell identity information, and a third does not require any positioning information.

30

25

After the terminal has been connected to the linking means, the linking means can control that the access point is correct, "ACCESS POINT KNOWN?" 550. For example, if the user has requested access to a server which no longer exists, is misspelled, or for some other reason is no longer known, the linking  
5 means could transmit an error message. This error message could then be displayed on the terminal, "DISPLAY ERROR MESSAGE" 560, providing the user with information about the error. Then the session could be terminated, either by the user or the linking means, "END" 570. If the access point is known, the linking means can send a pull to the server, "SEND PULL TO THE  
10 SERVER" 580.

In a preferred embodiment, the gateway is able to encode content sent over the wireless network to the wireless terminal and decode data sent to it by the wireless terminal. This means that the system, i.e. the terminal, the linking  
15 means and the server, can be provided with encoding/decoding means, which can enable a fast transmission of data packets between the server and the terminal. Hence, this enables a transfer of binary data packets, which is much easier to transfer than an data packet which is not coded.

20 Also, the system can also encrypt/decrypt data packets between the terminal and the server, in order to provide a high level of security when transmitting wireless information. The data packets comprising the request, the formatted request, the response and the formatted request. This means that the gateway is provided with encoders and decoders (not shown). Also, the  
25 server comprises different algorithms to make the encryption/decryption. The encryption/decryption itself may be performed by well-known methods, e.g. RSA, Diffie-Hellman, etc. One way of handling data packets in a binary format is to use so called WAP Binary Content Format, such as WBXML (Wireless Binary eXtended Markup Language).

30

Finally, when the server has sent the requested information to the linking means, the requested location information will be linked (pushed) further from the linking means to the terminal, "DISPLAY CONTENT" 590. However, it is not necessary to display the received content, e.g. it could be directly stored in the memory. Finally, the session could be terminated, either by the user or the linking means, "END" 570.

A preferred embodiment will also be explained with reference to Fig. 6 in the following. Any optional features in Fig. 6 are marked with dashed lines/boxes.

10 Box 600 represents a wireless communication terminal according to the invention, which could be a phone as mentioned before. This phone might be installed in a car and can be connected to a car navigation system.

The browser application 608 within the phone 600 generates a request, which comprises an access point, which indicates the site of the server 602, which can provide the requested location information. This access point is preferably a URL (Uniform Resource locator) as it is known from various internet applications.

20 The request for location information might be included in the URL itself or is attached to the request as a separate document. The request 610 is sent to the linking means 601, which is preferably a WAP gateway or a so called WAP proxy. The WAP proxy might receive the request from the phone 600 and forwards the request directly to the server 602 in step 611. Depending on the format of the request 610 from the phone the WAP proxy makes a protocol / format conversion in step 611 before it is forwarded to the server 602. The request is then forwarded to the server 602 in step 612.

The request 612 is then processed in box 614 at the server site. The result could be that some ready location information can be returned to the phone,

27

but in this example the result of the request processing is, that the position of the phone is necessary for the service.

Therefore the server 602 sends an indication of the requested location  
5 information in message 616 to the WAP proxy 601. The message 616 preferably contains a WML script which includes a script function to get the position of the phone 600. The message 616 is received by WAP Proxy 601 and if it is not already encoded, the WAP Proxy will encode the request in step 617. If it is encoded the WAP proxy 601 just forwards the message.

10

The encoded message is then transmitted to the phone 600 in step 618. The message 618 for obtaining the position information of the terminal 600 can be checked in step 620 for security/privacy reasons (i.e. the user is asked on the display if he agrees to return his position to the server). The user might allow  
15 to transmit the position or he gave in an earlier step a general agreement, that the position information can be given to this trusted server.

The received script function is then processed in step 622. During this process the position of the terminal is gathered from any available positioning  
20 system, which can indicate the position of the phone as described above. The result of the script processing 622 is a string which contains the representation of the position of the terminal in a format which can be recognised by the server 602.

25 This string is then optionally forwarded in step 626 to the encoding means 628. An example format after the encoding in step 628 could be a binary representation of a XML-document. Then it is forwarded through the transmitter of the phone 600 to the WAP proxy 601 in step 630. The string can also be forwarded directly (624,630) to the WAP proxy 601. An example  
30 of the return format in step 624 can be an XML-document.

The position message 632 contains the URL of the position requesting server besides the position information. If the string, which contains the position information, was already encoded in the phone 600 the WAP proxy decodes  
5 the string in step 634 before it is forwarded in step 636 to the server but the decoding can optionally also take place in step 638 at the server site 602.

However, if the terminal is not able to provide position information, and the server still needs to have the actual position of the terminal, there are  
10 alternative ways of obtaining this position information. Hence, if we look back on step 620 once more, and the terminal is no longer able to obtain position information, the terminal is able to forward this request of position information as a content type or a header to the linking means instead, i.e. step 632 is now a request instead of position information. The header fields allow the  
15 terminal to pass additional information about the position request, and about the terminal itself, to the linking means. These fields act as request modifiers, with semantics equivalent to the parameters on a programming language method (procedure) invocation. In this embodiment, it is preferred to use the content type. This content type or header might contain an indication that the  
20 terminal is not able to provide this position information, and it could be possible for the user of the terminal to set an option to search for alternative ways of obtaining the position information of the terminal. This searching could e.g. be done by means of the linking means, or even the server itself in some cases. If it is the linking means, which performs the search to find the  
25 location of the terminal, this information will be sent to the server, e.g. as an XML-document, i.e. the linking means is able to generate an XML-document comprising the position information. The position information can be obtained from the cell identity information, which is provided by the wireless telecommunication network, by using time difference information, and/or using  
30 time of arrival information. If it is the server, which performs the search to find

29

the location of the terminal, this information can then be handled by server directly (or indirectly) and generates the requested location information, based on the obtained position information. If the position information is handled directly, the server is able to search for the position information without  
5 sending a request to the terminal or the linking means. The position information can also be obtained in the same manner as in the case of the linking means, i.e. the cell identity information, which is provided by the wireless telecommunication network.

10 The server 602 can now process the complete request 610 in step 642 and returns the requested location information to the WAP proxy 601 in step 644. The response message 644 contains preferably a WML document. If the location information was not already encoded by the server it is encoded by the WAP proxy 601 in step 646 before it is forwarded to the phone 600 in step  
15 648.

Each time when messages are transmitted between the WAP proxy 601 and the phone 600 a communication session needs to be established or already established sessions can be used for this purpose. Before the WAP proxy 601  
20 transmits messages to the server 602 or the phone 600 it also checks if the message format is supported by the receiving terminal. If necessary the format is converted before the message is forwarded.

If the requested location information was originally eg a request for traffic  
25 information from a car navigation system within a vehicle the received information is not necessarily presented to the user. It could be possible that the browser application just forwards the information to the car navigation system which re-calculates the route to a destination based on the received traffic information without notifying the user about details of the traffic  
30 information. For example the user of a car navigation system also does not

30

need to be notified that the car navigation system initiated the request for traffic information before the car reached for example a motorway which is part of a calculated route to a destination.

5     The user interface.

With reference to Fig. 5a and 5b, an example is shown of how the display in a user interface can act when accessing a server according to the present invention. The user interface may comprise the same elements as shown in  
10     Fig.1, i.e. a keypad 2, a display 3, an on/off button 4, a speaker 5 and a microphone 6. Also, the terminal is provided with control means 18 as shown in Fig. 2, which controls the user interface. Starting from Fig. 5a, there is a layout 31 presented on a display in a phone, as shown in Fig.1 and 2, which indicates signal strength 35 from the wireless telecommunication network "D1  
15     Telekom" 40, the battery power 45 and a clock showing the time 50 in hours and minutes. Preferably, the display in the phone is an LCD (Liquid Crystal Display) display. The display, can be controlled by the control means. The layout 30 presents an example of the phone in idle mode, i.e. when the phone is activated and awaiting an action, e.g. an incoming or outgoing call. In the  
20     bottom of the display there are two items which are denoted as "Menu" 55 and "Names" 60. If the user selects "Names" 60 he/she can e.g. access a built in phone book. If the user selects "Menu" 55, he/she can select among several different menus. The actual selection of features in the bottom of the display, like "Menu" and "Names", can be selected by means of the soft keys  
25     disclosed with reference to Fig. 1.

One of the menus can be the next layout 65 called "Browser" 70. If the user chooses to use this menu, he/she can access different telecom related information services, e.g. Internet. One way of accessing this kind of  
30     information is to use the Wireless Application Protocol, WAP.



If the user chooses to select "Home" 71, this leads to the next layout 75, which graphically indicates, "Connecting to Service" 80. This shows an example of how the phone is trying to establish a connection to e.g. Internet, by sending an access request, through a gateway, to a server. If a connection is established to the gateway, some kind of welcome text for a home page might be displayed, "Welcome to D1 Web." 90. If the user selects "Options" 90, the terminal connects to the server which provides different services, which is graphically indicated by the same layout 75, indicating "Connecting to Service" 80. When the terminal is connected to the service, a list of selections can be displayed as shown in the following layout 110. For example, the different choices could be "Location information" 115, "White pages" 120, "Pizza" 125, "CNN" 130, etc. In this example the user selects to use the Location information 115, and browses further to the service in the next layout 135.

The numbers which refers to Fig. 5b are 135-210. In the layout 135 a browser display is shown with the selected item, which is indicated as a link to a service which provides a Location information. The user can select to chose this item, by using the "Options" 140.

For example, the layout can be provided with different editable fields and selection list placeholders, which in this example are shown in square brackets ([ ]). One selection in layout 160 can be highlighted (not shown), indicating a default state of the selection. In these fields, the user can input a location, e.g. a city or a street etc., "From:[Bochum]" 170, to another location, "To:[Düsseldorf]" 175. Hence, if the user presses "Options" 180, the user will be able to enter an editor to input the name of a location, e.g. "Düsseldorf"

185, like shown in layout 187. Thereafter, the user may press Ok 190, whenever he/she is done, or clear the location fields by selecting "Clear" 191.

If the user wishes to continue with his/her location related request, and  
5 chooses another city, the user selects the option "To [Graz]:" 225, which becomes highlighted upon selection, and is shown in layout 230. In the next layout 235, a selection list of available cities is displayed. The user selects e.g. "Gorden" 240, and selects the entry by selecting "Ok" 245. The next layout 250 highlights the selected city to receive location information about.  
10 Thereafter, the user may select "Options" 260, which in this example activates the calculation of the location and the result "Gorden: Stau on route 66..." 265 is displayed with the selected information in the next layout 270. The arrow 280 indicates there is more information to read, which the user can see when he/she scroll down by e.g. the softkeys.

15

The invention is not limited to the above described and in the drawing shown an example of embodiments but can be varied within the scope of the appended claims. For example, it can be further possible to make the receiving of location information more flexible, by providing an option to the  
20 user to specify which server he/she would like to receive location information from.

CLAIMS

1. A method of providing location information from a server (320-340) to a  
5 wireless communication terminal (1,300) in response to a request sent (530)  
from the terminal (1,300), said terminal is provided with a browser application  
(20), and the server (320-340) is provided with location means, the method  
comprising the steps of:
- 10 - generating a request (520) by means of the browser application (20),  
the request comprising at least one access point indicating the site of  
the server (320-340) to be accessed, and a query identifying requested  
location information, said query being independent of the position of  
the terminal (1,300),
  - 15 - initiating a session to linking means (360), by sending the request (530)  
from the communication terminal (1,300) via a wireless  
telecommunication network (310) to the linking means (360),
  - identifying the request (350) at the linking means (360), by means of  
said access point,
  - 20 - formatting the request at the linking means into a format supported by  
the server, and sending the formatted request (580) to the server (320-  
340),
  - processing the query at the server (320-340) by means of said location  
means,
  - sending a response to said formatted request from the server (320-  
25 340) to the linking means (360), said response comprising an indication  
of the requested location information,
  - establishing a session between said terminal (1,300) and said linking  
means (360) by formatting the response into a format supported by the  
terminal (1,300), and sending the formatted response from the linking

34

means (360), via the wireless telecommunication network (310), to the terminal (1,300), and

- presenting (590) said indication of the requested location information on said terminal, by means of said browser application (20).

5

2. A method according to claim 1, characterised in that said terminal (1,300) is further provided with security means, wherein said security means demands a confirmation of the request being sent to the server (320-340).

10 3. A method according to claim 1 or 2, characterised in that said request, formatted request, response and/or formatted response are encrypted by the terminal (1,300), the linking means (360) and/or the server (320-340), in order to provide a high level of security when transmitting wireless information.

15 4. A method according to claim 1, 2 or 3, characterised in that said request, formatted request, response and/or formatted response are encoded by the terminal (1,300), the linking means (360) and/or the server (320-340), in order to provide a fast transmission of the request, formatted request, response and formatted response.

20

5. A method according to claim 1, 2, 3, or 4, characterised in that said location means is performing the processing, by means of a database comprising location information.

25 6. A method according to any of the preceding claims, characterised in that formulating the request, formatted request, response and/or formatted response by using WML (Wireless Markup Language), a WML-script, or a XML (eXtended Markup Language).

35

7. A method according to any of the preceding claims, characterised in that said linking means is optionally searching for position information of said terminal, which is requested by the server, and sending the requested position information from the linking means to the server.

5

8. A method according to claim 7, characterised in that the linking means is searching for position information by sending a cellular position request to the wireless telecommunication network, to obtain the position information requested by the server.

10

9. A method according to any of the claims 1-6, characterised in that said server is optionally searching for position information of said terminal, and sending the requested location information from the server based on the retrieved position information through the linking means to the terminal.

15

10. A method according to claim 9, characterised in that the server is searching for position information by sending a cellular position request to the wireless telecommunication network, to obtain the requested location information based on said position information.

20

11. A method according to any of the preceding claims, characterised in that said terminal is provided with position means, to determine position information of the terminal, and optionally sends the positioning information to the server, upon a request from the server, in order to give an indication of the position of the terminal.

25

12. A method according to any of the preceding claims, *characterised in* that said terminal (1,300) is provided with position means (370), to determine position information of the terminal, and optionally sends the positioning

36

information to the server (320-340) in the request sent to the server, in order to give an indication of the position of the terminal.

13. A method according to claim 11 or 12, *characterised in* that said  
5 positioning information is obtained by providing the position means (370) with cell identity information, using observed time difference information, and/or using time of arrival information, wherein this information being provided by means of the wireless communication network (310).
- 10 14. A method according to claim 11 or 12, *characterised in* that said positioning information is obtained by providing the position means (370) with a satellite positioning system, which provides positioning information independent of the wireless communication network (310).
- 15 15. A wireless communication terminal (1,300) for accessing location information from a server (320-340), the terminal (1,300) comprising
- a receiver and a transmitter (19) arranged to receive and transmit data packets from/to at least one server (320-340) comprising location means, through a wireless communication network (310) connected to linking  
20 means (360), said linking means (360) is arranged to forward the data packets between the terminal (1,300) and the server (320-340);
  - a memory (17a,17b) comprising at least one item, which is provided with an access point which indicates the site of the server (320-340) to be accessed, wherein the server is accessed by sending a request (530)  
25 through the wireless communication network (310) as a data packet comprising the access point to the linking means (360) to access and receive content from the server (320-340);
  - a browser application (20), arranged to establish a session to the linking means (360) by reading (510) the item from the memory (17a,17b) ,  
30 enable the transmitter (19) to send the request (530) as a data packet

37

through the linking means (360) to the server (320-340), and handle received content by means of said receiver (19), and

- a user interface (2-6) connected to the browser application (20), said user interface (2-6) having display means (3,13) for displaying content (590) received from the server and user input means (2,6) to provide an input to the browser application,

characterised in that said input comprising a query of location information, which is independent of the position of the terminal (1,300), wherein the input is provided in the request, and arranged to receive and present content comprising an indication of said location information from said server (320-340) by means of said location means.

16. A wireless communication terminal (1,300) according to claim 15, characterised in that said terminal is further comprising security means, wherein said security means is arranged to demand a confirmation of the request being sent to the server (320-340).

17. A wireless communication terminal (1,300) according to claim 15 or 16, characterised in that said browsing application (20) is provided with encryption/decryption means to send the request and receive the content in an encrypted format, in order to provide a high level of security when transmitting wireless information.

18. A wireless communication terminal (1,300) according to claim 15, 16 or 17, characterised in that said browsing application (20) is further provided with encoding/decoding means to send the request and receive the content in a coded format, in order to provide a fast transmission of data packets.

19. A wireless communication terminal (1,300) according to claim 15, 16, 17 or 18, characterised in that the browsing application (20) is arranged to

38

formulate the request, formatted request, response and/or formatted response by using WML (Wireless Markup Language), a WML-script, or a XML (eXtended Markup Language).

5 20. A wireless communication terminal (1,300) according to any of claims 15-19, *characterised in* that said terminal (1,300) is further comprising position means (370), arranged to determine position information of the terminal (1,300), and to optionally send the positioning information to the server (320-340), upon a request from the server, in order to give an indication of the  
10 position of the terminal (1,300).

21. A wireless communication terminal (1,300) according to any of claims 15-19, characterised in that said terminal (1,300) is further comprising position means (370), arranged to determine position information of the terminal  
15 (1,300), and to optionally send the positioning information to the server (320-340) in the request sent to the server, in order to give an indication of the position of the terminal (1,300).

22. A wireless communication terminal (1,300) according to claim 20 or 21,  
20 characterised in that said position means (370) is provided by means of the wireless communication network (310), which is arranged to receive cell identity information, using observed time difference information, and/or using time of arrival information.

25 23. A wireless communication terminal (1,300) according to claim 20 or 21, characterised in that said position means (370) is provided by means of a satellite positioning system, which is arranged to receive positioning information independent of the wireless communication network (310).



39

24. A wireless communication terminal (1,300) according to any of claims 15-23, characterised in that said terminal is a cellular phone.
25. A system (301) for accessing location information from a server (320-340), said system (301) comprising
- a wireless communication terminal (1,300) having:
    - a receiver and a transmitter (19) arranged to receive and transmit data packets from/to at least one server (320-340) comprising location means, through a wireless communication network (310) connected to linking means (360), said linking means (360) is arranged to forward the data packets between the terminal (1,300) and the server (320-340);
    - a memory (17a,17b) comprising at least one item, which is provided with an access point which indicates the site of the server (320-340) to be accessed, wherein the server is accessed by sending a request (530) through the wireless communication network (310) as a data packet comprising the access point to the linking means (360) to access and receive content from the server (320-340);
    - a browser application (20), arranged to establish a session to the linking means (360) by reading the item from the memory (17a,17b), enable the transmitter (19) to send the request as a data packet through the linking means (360) to the server (320-340), and handle received content by means of said receiver (19), and
    - input (2,6) means to provide an input to the browser application (20), in order to access location information from the server (320-340)
  - a wireless communication network (310), arranged to establish a connection between the wireless communication terminal (1,300) and linking means (360),
  - linking means (360), arranged to enable a session for said wireless communication terminal (1,300) and to forward data packets between the terminal (1,300) and a server (320-340), and

40

- at least one server (320-340) comprising location means, arranged to receive and/or transmit data packets from/to the terminal (1,300), characterised in that said input, provided by the input means (2,6) on the terminal (1,300), comprising a query of location information, which is
- 5 independent of the position of the terminal, wherein the input is provided in the request, and arranged to receive and present content comprising an indication of said location information from said server (1,300) by means of said location means.
- 10 26. A system (301) according to claim 25, characterised in that said terminal (1,300) is further comprising security means, wherein said security means is arranged to demand a confirmation of the request being sent to the server (320-340).
- 15 27. A system (301) according to claim 25 or 26, characterised in that said system (301) is provided with encryption/decryption means arranged to said terminal (1,300), linking means(360), and/or server (320-340) to send the request and receive the content in an encrypted format, in order to provide a high level of security when transmitting wireless information.
- 20 28. A system (301) according to claim 25, 26 or 27, characterised in that said system (301) is further provided with encoding/decoding means arranged to said terminal(1,300), linking means (360), and/or server (320-340) to send the request and receive the content in a coded format, in order
- 25 to provide a fast transmission of data packets.
29. A system (301) according to any of claims 25-28, characterised in that said terminal (1,300) is further comprising position means (370), arranged to determine position information of the terminal (1,300), and to optionally send

the positioning information to the server (320-340) upon a request from the server, in order to give an indication of the position of the terminal (1,300).

30. A system (301) according to any of claims 25-28, *characterised in that*  
5 said terminal (1,300) is further comprising position means (370), arranged to determine position information of the terminal (1,300), and to optionally send the positioning information to the server (320-340) in the request sent to the server, in order to give an indication of the position of the terminal (1,300).
- 10 31. A system (301) according to claim 29 or 30, characterised in that said position means (370) is provided by means of the wireless communication network (310), which is arranged to receive cell identity information, using observed time difference information, and/or using time of arrival information.
- 15 32. A system (301) according to claim 29 or 30, characterised in that said position means (370) is provided by means of a global satellite system, which is arranged to receive positioning information independent of the wireless communication network (310).
- 20 33. A system (301) according to any of claims 25-32, characterised in that communication between the server (320-340), the linking means (360) and the terminal (1,300) are in accordance with the Wireless Application Protocol.
- 25 34. A system (301) according to any of claims 25-33, characterised in that the terminal, linking means and/or server are arranged to formulate the request, formatted request, response and/or formatted response, respectively, by using WML (Wireless Markup Language), a WML-script, or a XML (eXtended Markup Language).

1 / 6

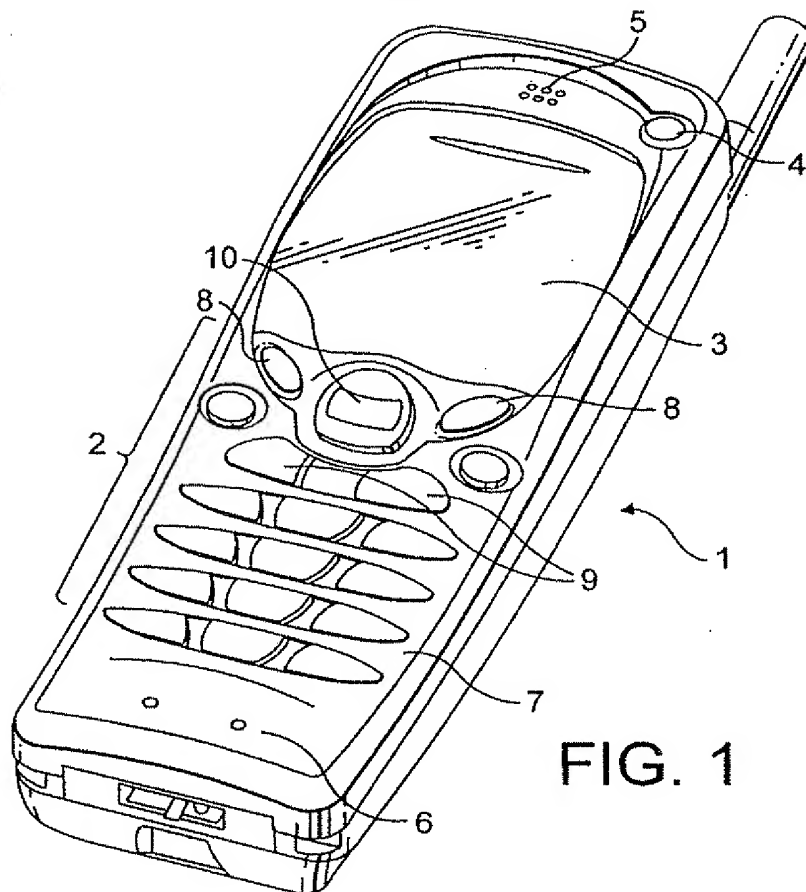


FIG. 1

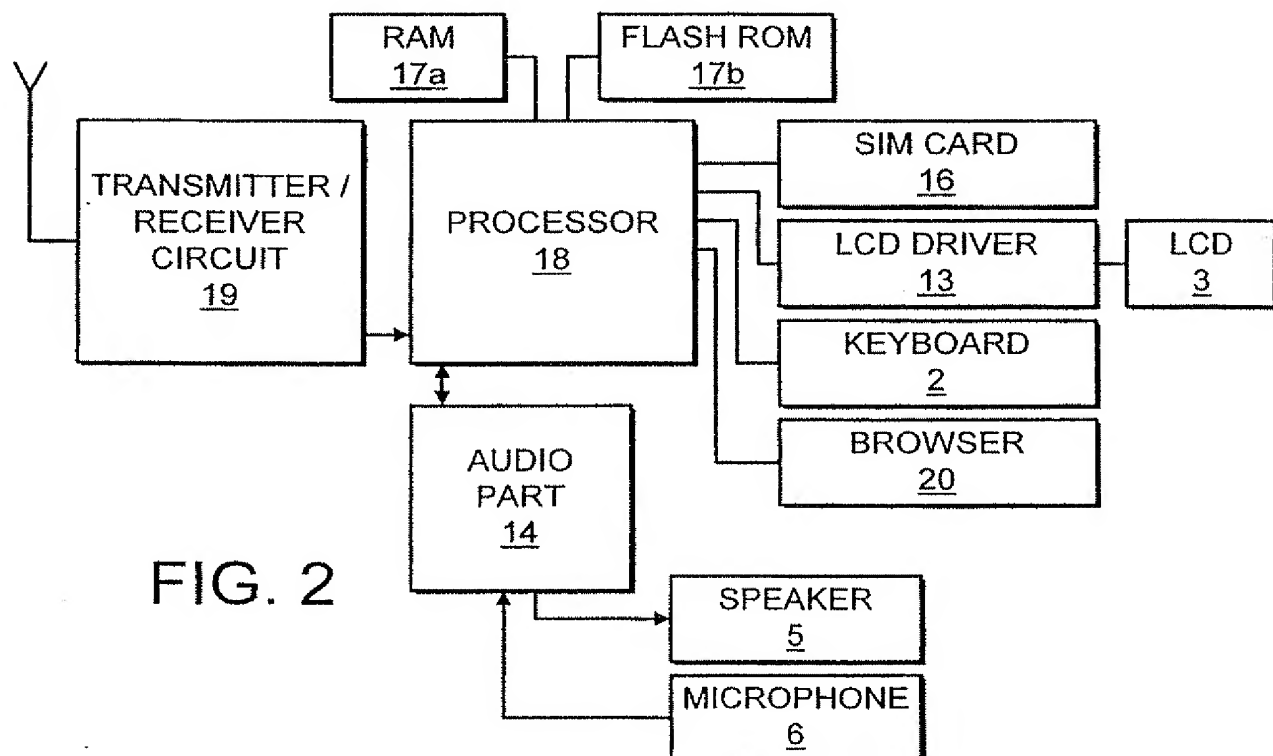


FIG. 2

2 / 6

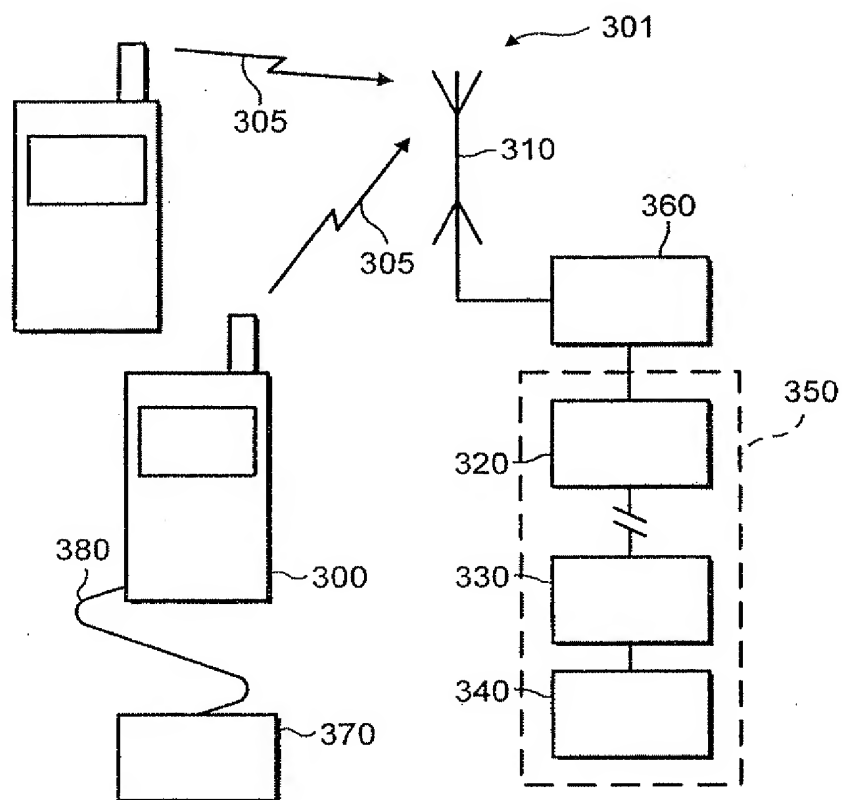


FIG. 3

3 / 6

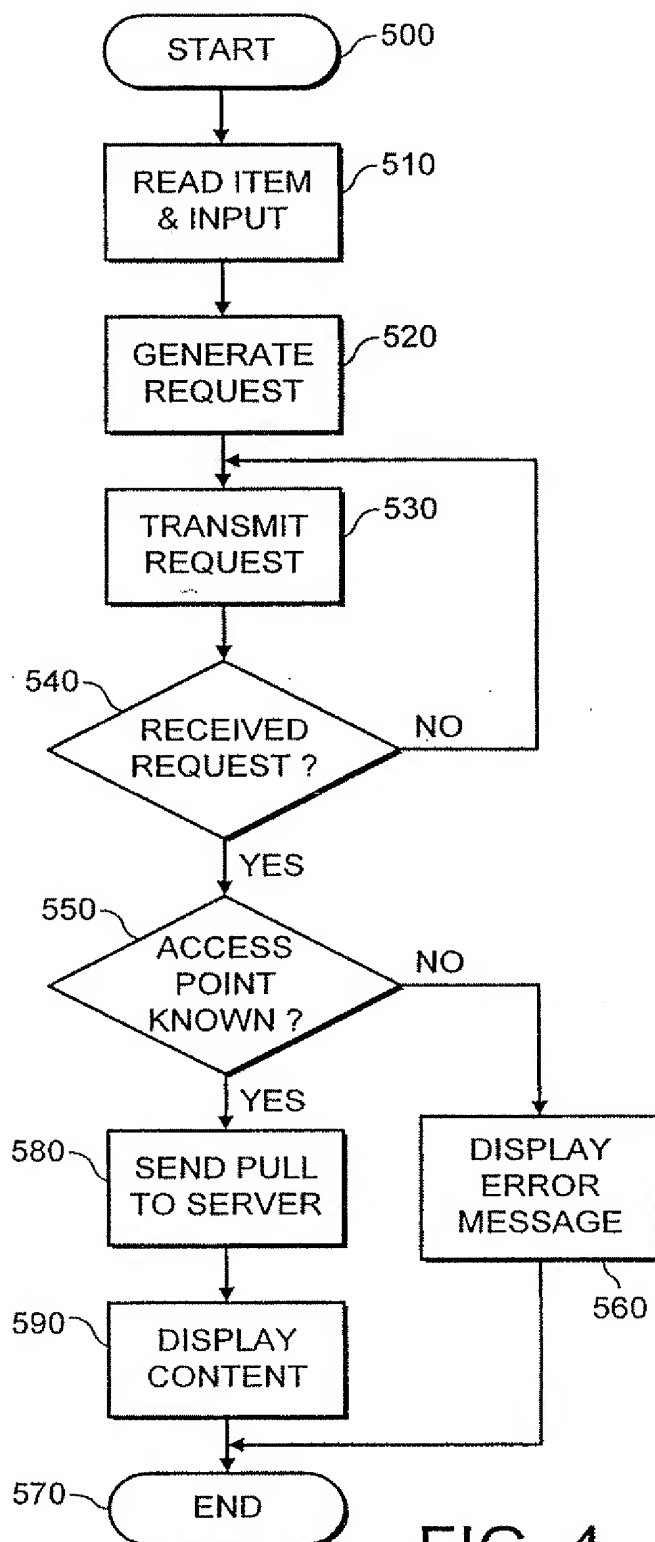
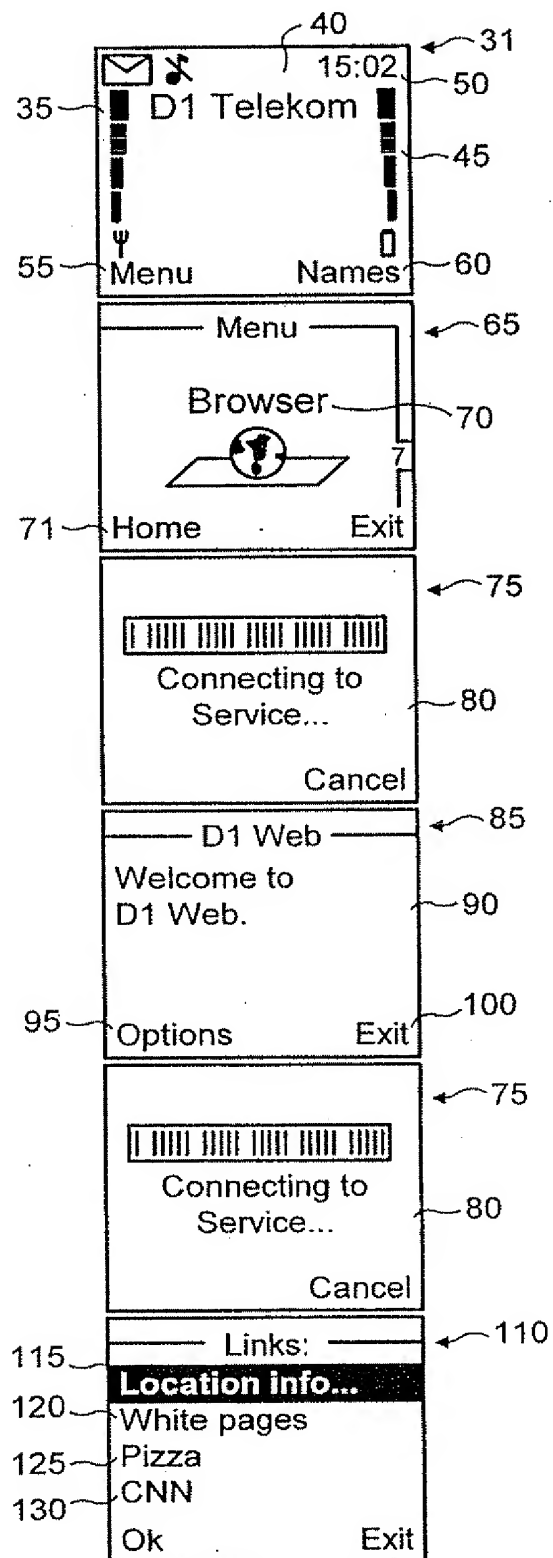


FIG. 4

4 / 6

FIG. 5a



5 / 6

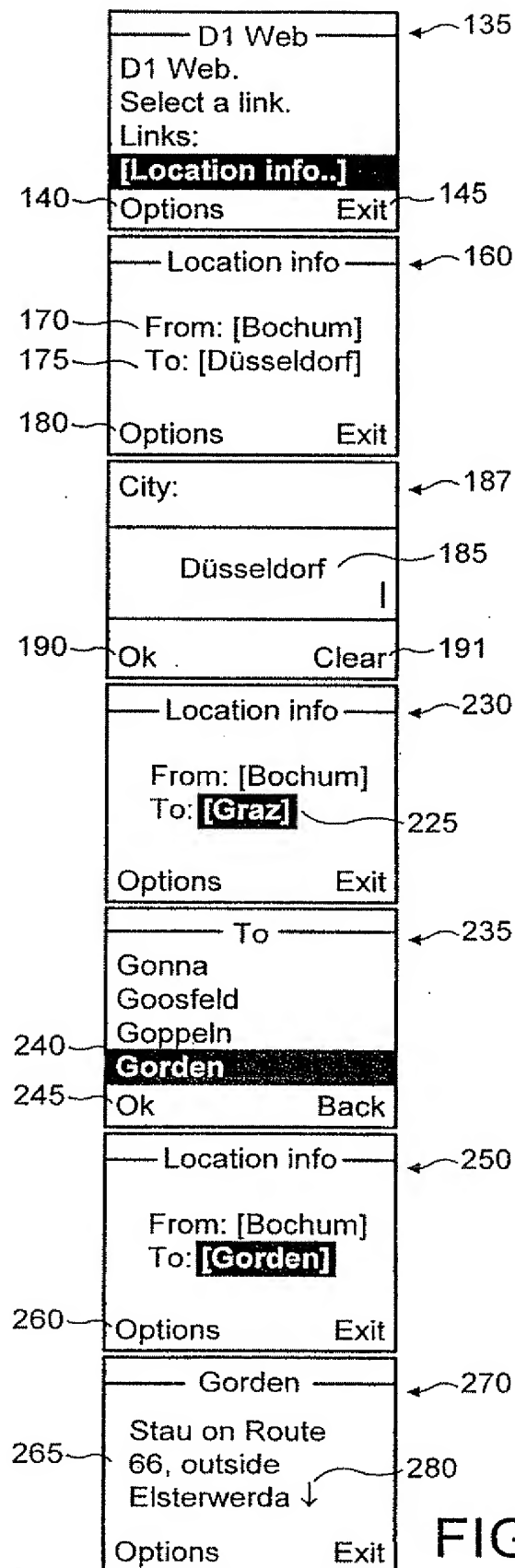


FIG. 5b



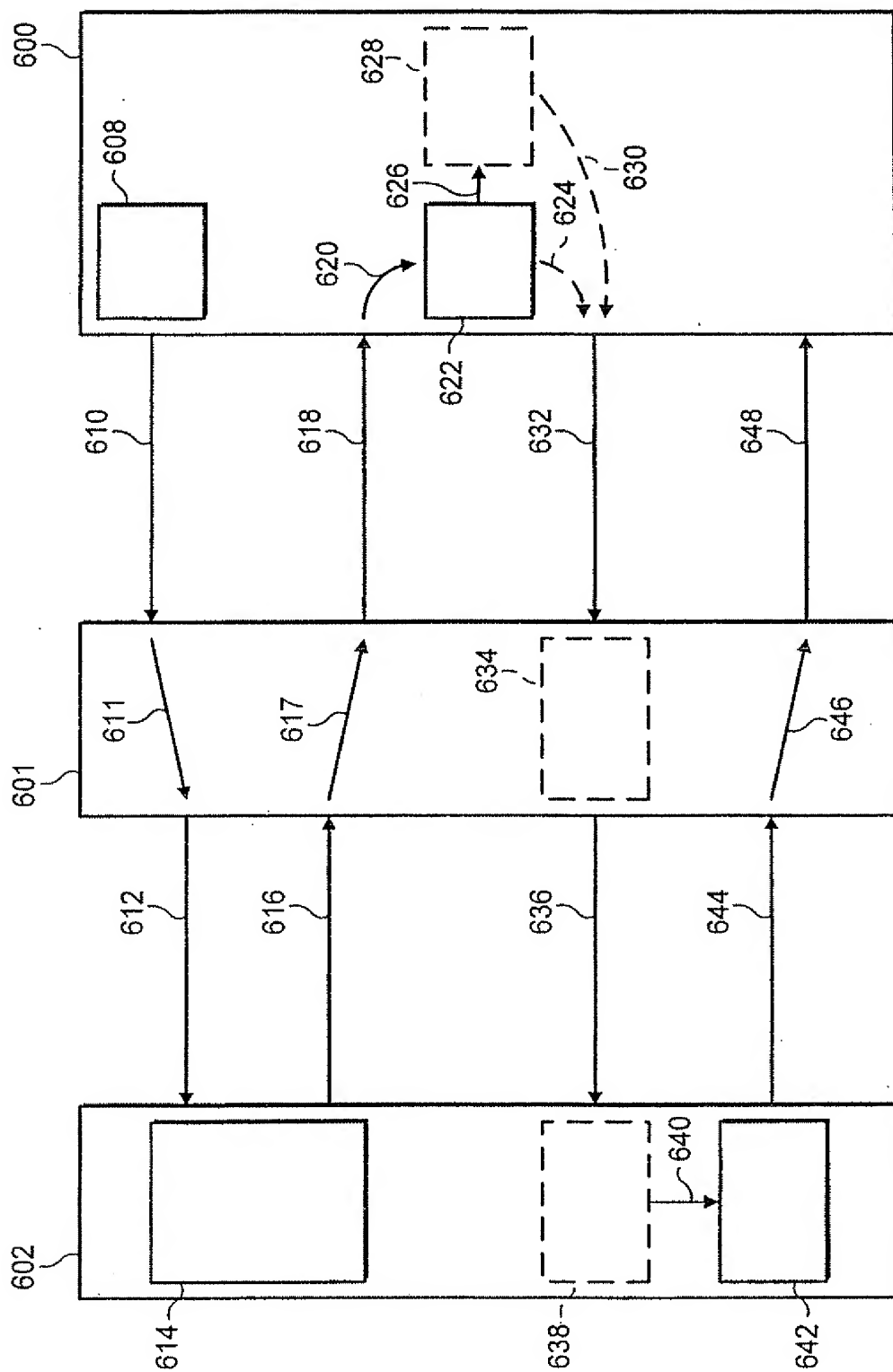


FIG. 6

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/08521

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04Q7/22 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04L G05D G08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>FUJINO N ET AL: "MOBILE INFORMATION SERVICE BASED ON MULTI-AGENT ARCHITECTURE" IEICE TRANSACTIONS ON COMMUNICATIONS, JP, INSTITUTE OF ELECTRONICS INFORMATION AND COMM. ENG. TOKYO, vol. E80-B, no. 10, 1 October 1997 (1997-10-01), pages 1401-1406, XP000734533 ISSN: 0916-8516 page 1, right-hand column, line 10 - line 17 page 2, left-hand column, line 16 -right-hand column, line 5 page 3, right-hand column, line 4 - line 11 page 4, left-hand column, line 19 -right-hand column, line 11</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/-</p>	1-34

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

28 November 2000

Date of mailing of the international search report

04/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Heinrich, D

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/08521

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 99 27742 A (ERICSSON GE MOBILE INC)  3 June 1999 (1999-06-03)  cited in the application  page 6, line 10 - line 28  page 7, line 3 - line 18  page 8, line 5 - line 17</p>	1-34
A	<p>WO 98 59506 A (TELIA AB)  30 December 1998 (1998-12-30)  page 2, line 19 -page 3, line 1  page 3, line 23 -page 4, line 9  page 5, line 1 - line 12  page 6, line 20 -page 7, line 6  page 7, line 26 -page 8, line 4  page 8, line 16 - line 18</p>	1-34
A	<p>US 5 673 322 A (BROCKMAN JAMES JOSEPH ET  AL) 30 September 1997 (1997-09-30)  column 6, line 53 - line 67  column 7, line 15 - line 37  column 7, line 58 - line 65  column 8, line 6 - line 16</p>	1-34

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/08521

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9927742	A	03-06-1999	US 6088594 A AU 1596399 A BR 9815041 A	11-07-2000 15-06-1999 03-10-2000
WO 9859506	A	30-12-1998	SE 9702388 A	24-12-1998
US 5673322	A	30-09-1997	AU 707755 B AU 5525696 A CA 2247536 A CN 1215518 A EP 0885501 A JP 11507152 T WO 9735402 A	22-07-1999 10-10-1997 25-09-1997 28-04-1999 23-12-1998 22-06-1999 25-09-1997